

(19) World Intellectual Property
Organization
International Bureau



APR 2005

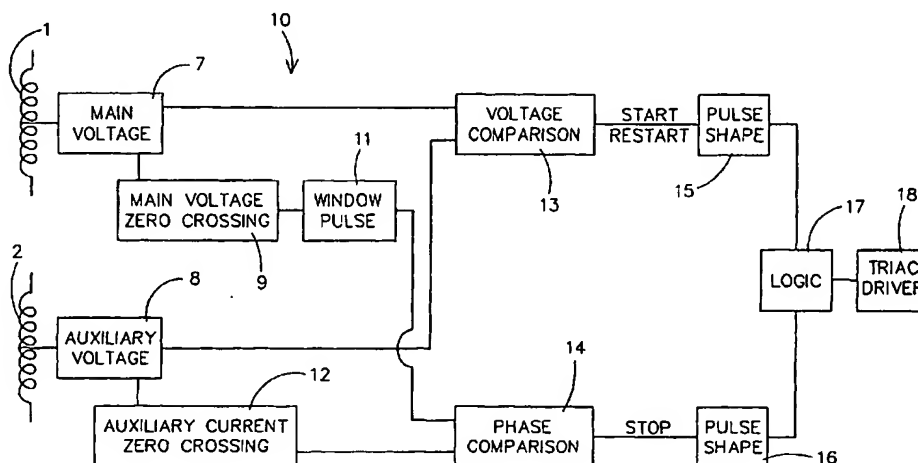
(43) International Publication Date
6 May 2004 (06.05.2004)

PCT

(10) International Publication Number
WO 2004/038906 A1

- (51) International Patent Classification⁷: H02P 7/36 (81) Designated States (national): CA, CN, JP, KR, US.
- (21) International Application Number: PCT/US2002/033750 (84) Designated States (regional): European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR).
- (22) International Filing Date: 22 October 2002 (22.10.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (71) Applicant and
(72) Inventor: YOUNG-KEE, Min [US/US]; 1705 Fairhaven Blvd., Elm Grove, WI 53122 (US).
- (74) Agent: HEINO, Joseph, S.; Davis & Kuelthau, s.c., 111 E. Kilbourn Ave., Ste.1400, Milwaukee, WI 53202-6613 (US).
- Declarations under Rule 4.17:
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations
— of inventorship (Rule 4.17(iv)) for US only
- Published:
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LOAD AND SPEED SENSITIVE MOTOR STARTING CIRCUIT AND METHOD



(57) **Abstract:** A circuit and method measures the voltage at the main motor winding (1) and detects the points in the electromagnetic wave cycle at which this voltage "crosses" zero. The method and circuit also measures the voltage at the auxiliary motor winding (2). The voltages measured in the main winding (1) and in the auxiliary winding (2) are compared by the circuit (13) as a means for starting and restarting the auxiliary winding (2). The circuit and method also detects the points in the electromagnetic wave cycle where the current in the auxiliary winding "crosses" zero and compares the phase of these current zero crossing points with a window pulse (11) that is generated when the main voltage crosses zero. When the zero current crossing points fall within the window pulse, the auxiliary winding (2) is up to proper operating speed and the auxiliary winding (2) is disconnected by the starting circuit. If the load on the main motor winding (1) increases or the main motor winding (1) speed decreases below a certain predetermined speed, the auxiliary winding (2) is switched back into the circuit to boost the speed of the main motor winding (1).